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BOTANICAL OBSERVATIONS ALONG THE No. 1 RABBIT PROOF FENCE

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Although Western Australia possesses well over 6,000 species of plants, and is acknowledged as having one of the largest and most unique floras of any country in the world, there are extensive areas of the State which have not yet been explored botanically. A large part of this unknown country is in the Eremean Province, and, because of the great distances to be travelled, and the desolate conditions to be reckoned with in these regions, botanical investigations are necessarily few and far between. It was, therefore, with a great deal of pleasure that in May last year (1947) I set out with Mr. A. S. Wild, the Chief Vermin Inspector of the Agricultural Department, on a trip of inspection along the northern end of the No. 1 Rabbit Proof Fence which took us through a portion of this unknown country. Some slight knowledge of the area was available through the collections of Mr. A. W. Crawford, a former Chief Inspector, but it was hoped that a much more detailed investigation could be made, particularly from the point of view of plant distribution.

We travelled by car from Perth to Meekatharra and then along the Northern Highway to Mundiwindi, where we branched off to the departmental depot at Jigalong, 30 odd miles to the east of the highway, and about five miles north of the Tropic of Capricorn. Here we were joined by Mr. G. Beattie who is stationed at Jigalong, and who is in charge of maintenance work on the northern length of the fence. With eight camels in the charge of two of Mr. Beattie's native boys we set off along the fence the following morning, leaving the car at the depot. Riding the "ship of the desert" is a somewhat harrowing experience for the novice, and one is usually quite satisfied to walk after half an hour in the saddle.

The country in the vicinity of the Jigalong depot is a flat, treeless plain broken only by a few stony hills, one of which is said to be used by the bucks of the local tribe of aborigines as the hiding place for the tribe's ceremonial dresses, and the area is strictly "taboo" to the women. The plain carries a typical salt-pan vegetation of *Bassia*, *Kochia* (blue-bush), *Podolepis* and *Arthrocnemum* (samphire), together with *Sporobolus* and *Aristida* (windgrass) which provide the main cover around the bare grey salt-

pans. On the small sandy ridges and wherever the soil is less compact, other grasses occur, including species of *Eriachne*, *Eragrostis* (wandeerie grass) and *Iseilema*. Species of *Calandrinia* (parakeelya and Aizoaceae occur in the hard pebbly soils, while in places *Brachyachne prostrata* forms a pure stand in small clayey, pebbly depressions.

Between the Jigalong plain and the true spinifex country, the vegetation and soil type change successively through several associations. As the plain merges into mulga country, *Aristida arcuaria* becomes more plentiful, *Kochia* and *Arthrocnemum* disappear although *Bassia bicornis* persists almost to the mulga. As the sandy nature of the soil becomes more evident, occasional plants of spinifex and *Aristida Browniana* appear, and gradually increase in numbers until in the mulga belt proper they are important members of the ground flora. The mulga here occurs in a belt several miles wide, in a comparatively dense stand, but about five miles north of Jigalong the soil becomes loose and sandy, and the glaucous, opposite-leaved form of the desert mallee, *Eucalyptus odontocarpa*, takes the place of mulga in the association. Interspersed with the mallee in the sandy soil are low bushy species of *Acacia* and the yellow-flowered *Grevillea eriostachya*.

In the vicinity of the 635 mile peg, and about ten miles north of Jigalong, the *Eucalyptus* passes out of the association, and only the shrubby *Acacia* remains. *Triodia* and *Plectrachne* tend to thin out over large areas, although in places they remain dominant, and a great variety of herbs and shrubby species enter the association, providing a riot of colour and form so uncommon as a rule in spinifex country. Malvaceae, Solanaceae and Verbenaceae occur in greatest numbers both as regards species and individuals, whilst Papilionaceae, Zygophyllaceae, Boraginaceae and Amarantaceae provide a large number of individuals of a comparatively few species. The most common grasses, apart from *Triodia* and *Plectrachne*, are species of *Aristida*, *Eragrostis* and *Eriachne*, together with *Ichnanthus australiensis* and *Plagiosetum refractum*, the last named a showy species with violet-tinged spikelets common on all sandy soils.

Over the thirty miles of the first two days' travel the lower storey of the shrubby element retains its dominance over *Triodia*, and a large proportion of the shrubs such as *Acacia*, *Solanum*, *Halgania* and species of Verbenaceae, attain a height of three or four feet. As the *Triodia* becomes more plentiful, the shrubs become fewer and more stunted until in the true spinifex plain they are reduced to the general height of the spinifex clumps. Typical of these shrubs are *Acacia lycopodiifolia* and *A. translucens*, the latter known locally as "bardy bush", from the fact that the main root of the plant is usually infested with those "grubs" which are so relished by the Australian aborigine.

These shrubs are about 18 to 20 inches in height and up to five or six feet in diameter, and when in flower, the yellow masses scattered through a sea of *Triodia* are a pleasing sight. The whole country is at a uniform level, except for the scattered taller shrubs. Chief among these are *Hakea Cunninghamii* (corkwood),

Grevillea Wiekhami and species of *Melaleuca*, *Cassia* and *Acacia*. The most abundant is *Grevillea Wiekhami* which in places forms dense thickets and occurs in both the red and orange colour forms.

At mid-day on the fourth day, we left the fence about ten miles north of Stag Arrow Creek and travelled due east until we arrived at the Oakover River. This stream rises in Talawana Station country and flows in a general north and north-easterly



Acrachne verticillata (Roxb.) Chiov. A. General habit of plant. B. Spikelet (x 6).

direction to unite with the Nullagine River to form the De Grey River. In the flat country east of the fence the flood plain of the river is nearly a mile wide, and cut up by numerous channels. As a rule these channels are comparatively narrow and separated by broad flats carrying *Eucalyptus camaldulensis* (river gum) and species of *Aristida* and *Chrysopogon* (sugar-grass), as well as numerous shrubs and herbs, prominent among which are *Mulvastrum spicatum*, *Flavaria australasica*, *Lotus australis*, and species of *Acacia*. Unfortunately a large part of the area had recently been burnt, and only in restricted areas were annual species still growing.

The river has no continuous broad sandy bed as one would expect, but a series of short lagoons or billabongs. One of the narrow channels broadens out into a perfect imitation of a main stream, only to come to an abrupt end where a sand bank and dense vegetation divert the water out on to the flood plain. Here it eventually collects into another channel, which in its turn broadens out into a wide sandy river bed which runs for a mile or more before it, too, terminates in a sandy bank, spilling the water once again into the plain. And so the process continues until a permanent bed is eventually formed. On one bank which had escaped the fire I collected a specimen of one of the rarest grasses in the State, *Acrachne verticillata*. It is a species which is widespread in Asia and Africa, but in Western Australia it has previously only been known from the specimens collected by Pemberton Walcott in the middle of last century at Exmouth Gulf and Dampier Archipelago. It is a small annual species, one to two feet in height, with numerous racemes of spikelets scattered up the stem or radiating from the summit. It somewhat resembles Rhodes grass in the inflorescence, but has many more florets in each spikelet, and has a glistening silvery sheen, quite unlike any of the species of *Chloris*.

Although a few isolated sandhills occur in the spinifex country, there is nothing in their flora which differs from that of the surrounding country, and the sandhill formation proper first becomes evident several miles north of Lookout Rocks. The area is characterised by parallel sandy hills running in a general east and west direction, separated by valleys of more compact, sometimes pebbly sandy soil. It is the western edge of the vast inland area which Jutson terms "Sandland" in his *Physiography of Western Australia*, and which has been built up by centuries of prevailing east winds.

Species of the Order Leguminosae have become specialised as the flora of the sandhills: *Crotalaria Cunninghamii*, the "bird flower" of the regions nearer the coast; a remarkable unarmed form of *Templetonia aculeata*; an apparently unnamed species of *Burtonia*; and several species of *Tephrosia* and *Cassia* are only found on the sandhills, and with few exceptions only one of these species could be found on any one hill. The grasses *Plagiostetum refractum* and the purple-glumed form of *Eriachne aristida*, are a constant feature not only of the sandhills but also of the sandy approaches, and small sandy banks in the valleys. Species of

Acacia, *Grevillea* and *Malvaceae* are also found on the hills, while *Cleome tetrandra* and *Adriana Hookeri* (a species not previously recorded for Western Australia) are common to both the hills and the valleys.

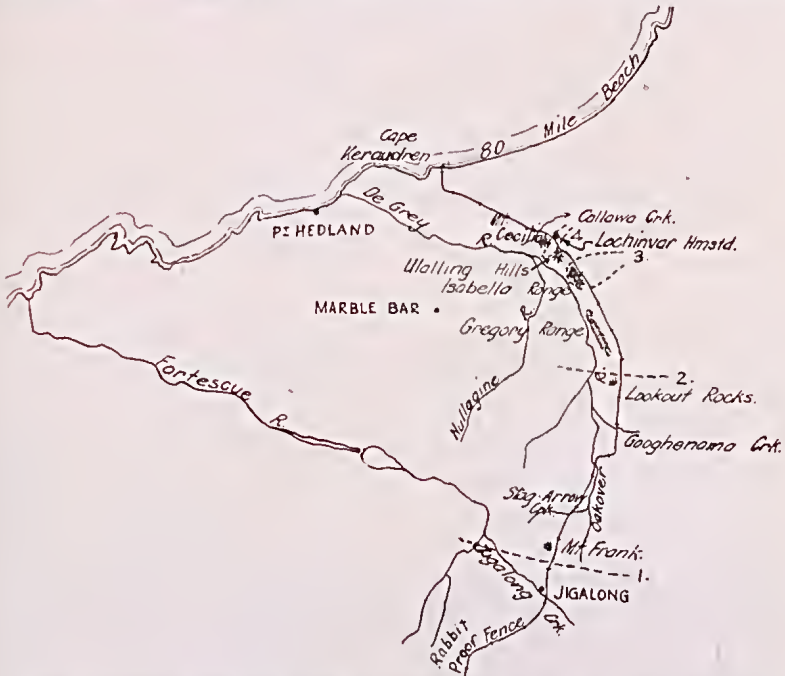
On the whole the distribution of any one species in the valleys is fairly uniform over the whole area, but occasionally conditions in one valley or in one section of a large valley, apparently favour one species to the detriment of others. Thus one valley is dominated by *Plectrachne Schinzii*, another by *Melaleuca lasiandra*, and a third by *Tephrosia uniovulata*.

The Northern End of the No. 1 Rabbit Proof Fence

1. Southern edge of the spinifex belt; between Jigalong and this point, the vegetation changes rapidly through several distinct associations.

2. Southern edge of the sandhill country. Within the spinifex belt between 1 and 2, is the northern limit of mulga, approximately two miles north of Googhenama Creek.

The sandhill country extends to Callawa Creek and a few miles beyond, and is broken by sandstone at 3, and by numerous small watercourses at 4.



The smaller shrubs and undershrubs are less abundant than in the southern spinifex country. The family Goodeniaceae, which was so rich in forms in the south, is confined to a few species of rather restricted range. The small, hirsute, blue-flowered *Seaevola parvifolia* alone has a range extending practically from Sandy Creek to the Isabella Range. Shrubby members of the family are represented by two species of *Dampiera*, one having red, and the other pink flowers, which are fairly common in the valleys to the



Callawa Creek, showing high banks and broad sandy bed; the vegetation includes *Eucalyptus camaldulensis* (river gum) and species of *Acacia*.



the vegetation in the foreground was killed off by inundation. A clay pan filled with water at the old Lochinvar homestead;

north of Gregory Range. Associated with these are two other shrubs which are probably Goodeniaceae, one of which closely resembles *Seaevola nitida* of the coastal beaches, but as neither was seen in flower, their identity remains uncertain. Verbenaceae is restricted to two species, the more common of which is *Neweastlia eladotricha*, while Boraginaceae enters the association with three shrubby species of *Heliotropium*. *Solanum* and *Halgania*, so abundant in the south, are comparatively poorly represented, while annuals such as *Polyearpaea*, *Amaranthus*, *Euphorbia* and *Triehinium* are of importance. On several sandy banks *Boerhaavia diffusa* (tar-vine), the yellow-flowered *Cleome viscosa* and species of Zygophyllaceae assume local dominance and form important sand-binding elements.

Towards its northern end the fence passes out of the true sandhill country, and enters a region of sandstone hills in the vicinity of Isabella Range. Spinifex remains dominant in the sandy areas between the hills, and from time to time sandhills reappear with their characteristic vegetation, but there are large tracts of sandy, stony soil, such as were encountered only in small isolated patches southwards from Gregory Range.

The vegetation over the area is sparse, the clumps of *Triodia* are small and of a less luxuriant habit, while small herbs and annual species become more plentiful. Tall shrubs are restricted to the two species *Grevillea Wiekhami* and *G. refracta* together with scattered *Eucalyptus*. The smaller shrub element consists of species of *Acaëia*, *Halgania* and *Solanum*, particularly *S. diversiflorum*, with scattered plants of *Heliotropium*. The whole aspect of the country is one of extreme poverty. This may have been due to the poor rainfall experienced in that restricted area, where the wells were very low and quite brackish, even salty. On the other hand water was plentiful in the wells south of Isabella Range, where the vegetation showed no signs of arid conditions, while not many miles north of Ullalling Hills was a clay-pan of several acres in extent, containing over a foot of water.

Towards Mount Cecilia the country is broken by numerous streams, presumably tributaries of the Oakover River, and the vegetation undergoes a change. *Owenia reticulata*, *Dolichandrone heterophylla* and the camel or broad-leaved poison, *Erythrophloeum Labouchei*, become the dominant trees, while the ground cover of spinifex and shrubs becomes even more sparse. The association does not persist for long, however, and by the time Mount Cecilia is reached, the sandhill country is once again in evidence with its spinifex and low shrubs. At the last well, some thirteen miles from Callawa Creek, is the first evidence of the approach to civilisation—a dense stand of the pillow weed, *Ærua tomentosa*.

The camel trip was terminated at Callawa Creek which is a broad sandy stream flowing in a north-easterly direction into the pindan desert, and is lined with the usual *Eucalyptus eamaldulensis* and thickets of *Acacia* with smaller shrubs and herbs including *Evolvulus alsinoides*, *Sebastiania chamelæa* and species of Malvaceae and Convolvulaceae.

We were met at the Creek by Mr. C. Blair, of the Vermin Branch of the Department, and in his ear we left the fence to avoid rough sandstone hills, and after travelling several miles through station country, we struck it again in typical pindan country. *Triodia pungens* is the dominant ground cover, while the shrubby element is provided by *Grevillea Wiekhami*, *Erythrophloeum labouchei* and several species of *Acacia*, chief among which are *A. trachycarpa* and *A. tumida*. Occasionally the spinifex plain is broken by rugged sandstone outcrops on which is a white-barked species of *Eucalyptus* attaining considerable size, and reputed to have a bark of particularly high tannin content. This pindan country persists almost to the coast, where other shrubs, chiefly Cadjiput (*Melaleuca spp.*), enter the association, which finally gives place to saline flats and mangrove swamps on the coast. The fence follows high ground and enters the sea at the tip of Cape Keraudren, at the southern extremity of the Eighty Mile Beach.

During the course of the trip along the fence, a comprehensive collection of 436 sheets of botanical specimens was made. Although the season was well advanced and many of the species, particularly in the families Gramineae and Verbenaceae, were past the flowering stage, the collection is fairly representative of the flora, and it is hoped that when all the specimens have been identified, it will provide interesting additional information on the distribution of known species as well as providing several new ones.

This is the first occasion on which a detailed investigation of the area has been made, and I would like to express my thanks to Mr. C. A. Gardner, the Government Botanist, and to Mr. Wild, for making my trip possible.

OBSERVATIONS OF SEA BIRDS ON A VOYAGE FROM MELBOURNE TO ENGLAND, 1947

By Captain MARK TAYLOR, R.N., Stansfield, Suffolk, England.

I left Melbourne in the m.v. *Port Fremantle* on June 28, 1947, bound for Newcastle, England, via Fremantle and Cape Town; and was fortunate to have with me two of the essentials for watching birds at sea, a pair of good binoculars and a copy of W. B. Alexander's *Birds of the Ocean*.

Even with these aids the identification of the petrels is by no means easy. The fleeting glimpses over the crests of the swell, usually at a distance and in changing lights, make observation of detail difficult. I have always found that the only way to achieve accurate notes is to have a notebook already made out in headings under which a long-suffering fellow passenger may be induced to write the details as momentarily observed and dictated. Suggested headings and sub-headings are:—Bill. Head: crown, face, chin. Upper-parts: neck, back, tail-coverts, tail. Under-parts: throat, breast, belly, tail-coverts, tail. Wings: upper, under. Legs and feet. Characteristics: size, flight, numbers, etc. Without such aid it is